Distribution of Polar Bear Maternal Dens on land in Northern Alaska

Spring 1982 through Spring 2001

USGS Biological Resource Division Alaska Biological Science Center Polar Bear Research Project June 8, 2001

Methods:

Each year between 1982 and 2001 (except 1990, 1993, 1995 and 1996), we fitted a sample of pregnant female polar bears with radio transmitting collars. Most collars were deployed on bears captured on the sea ice between the Canadian border with Alaska (141° W longitude) and the Colville River Delta (150° 30' W longitude) in west-central Alaska. Smaller numbers of bears were instrumented at points east and west of this region. Previous work verified that locations where bears were radio collared were independent of the locations where they subsequently denned (Amstrup and Gardner 1994). Hence, the distribution of our research efforts did not bias the den distributions we observed. Radio-collared females always comprised a small portion of the total population. As in all telemetry studies, however, we assumed that the movements and denning locations of instrumented bears were representative of the movements and denning locations of the larger portion of the population that was not instrumented. Therefore, den locations described here do not represent total numbers of dens of all bears, but they do represent the spatial distribution of dens in coastal northern Alaska.

Most polar bears enter their dens in October or November. Some wait until early December to enter their dens. Birth is thought to occur in late December or early January. Many animals relocate from one denning location to another early in winter. This report describes locations only of dens created by solitary female polar bears in autumn or early winter that were occupied at least until 1 January. These criteria prevent temporary shelters or abandoned dens from being counted along with dens that were occupied until the presumed time of parturition.

Amstrup and Gardner (1994) suggested that the proportion of dens on land was increasing through their study period (1982 – 1991). Whereas all land and fast ice dens reported here were visited by researchers and visually confirmed, budgetary constraints prevented consistent visual confirmation of pack-ice dens after 1992. Prior to 1992, Polar Bear Project biologists flew long missions across the pack ice to confirm existence of pack-ice dens occupied by radio-tagged bears. The possible change in proportional distribution through the study and the less consistent confirmation of pack ice dens after 1992 prompted us to divide our study into two periods. The first period extended from spring of 1982 through spring 1991. The second period included spring 1992 through spring 2001.

Results:

Radio-collared polar bears denned from Wrangell Island in eastern Russia (178° E) to Queen Victoria Island in Canada (116° W). In this report, however, we focus upon dens found along the mainland coast of Alaska and adjacent Canada between approximately Point Hope, Alaska and the McKenzie River Delta in the Yukon Territory, Canada (167° W to 137° W).

From spring of 1982 through spring of 2001, **182 maternal dens** were discovered by telemetry. Of those, **150** were within our focal study area from 167° to 137° W. Polar bear dens occurred on land, pack ice and land fast ice (Table 1). Transportation and other industrial activities are often concentrated along shore or in the near shore land fast ice areas. Therefore, from the standpoint of potential interaction with humans, land and fast-ice dens can be treated as one group. Dens in the active pack ice are isolated from human activities and are not summarized here. **Seventy-three of the 150** maternal dens discovered by telemetry between 167° W and 137° W were on land or fast ice.

Denning on The Arctic National Wildlife Refuge (ANWR):

Of the 73 dens on land (or fast ice), **32 (44%) were within the bounds of ANWR and 24 (33%) were in the 1002 Area**. The proportion of dens located on **ANWR dropped from 47% to 41% between the first and second half of the study**; while the proportion of dens located within the bounds of the **1002 area dropped from 36% to 30%** (Table 1). The proportion of pack ice dens dropped dramatically in the latter half of the study. The decrease in proportion of land dens on ANWR was accompanied by an increase in the proportion of dens found on land areas west of ANWR (Figure 1). Although this distribution shift is apparent on a map, we cannot currently explain it and it is not statistically significant (Chi-square test P=0.88). The decrease in off-shore effort in the latter half of the study may explain a portion of the decline in numbers of dens on pack-ice.

Caveats:

Information presented in this report will be updated each year as more polar bear dens are discovered. Data presented here are currently being analyzed for presentation in refereed scientific publications. They must be considered preliminary and part of research in progress. They are provided only for public information and are not to be published or in any way presented as if they were a final research product. Any information used from this report must be accompanied by the date of this report and be credited to the USGS Alaska Biological Science Center, Polar Bear Research program.

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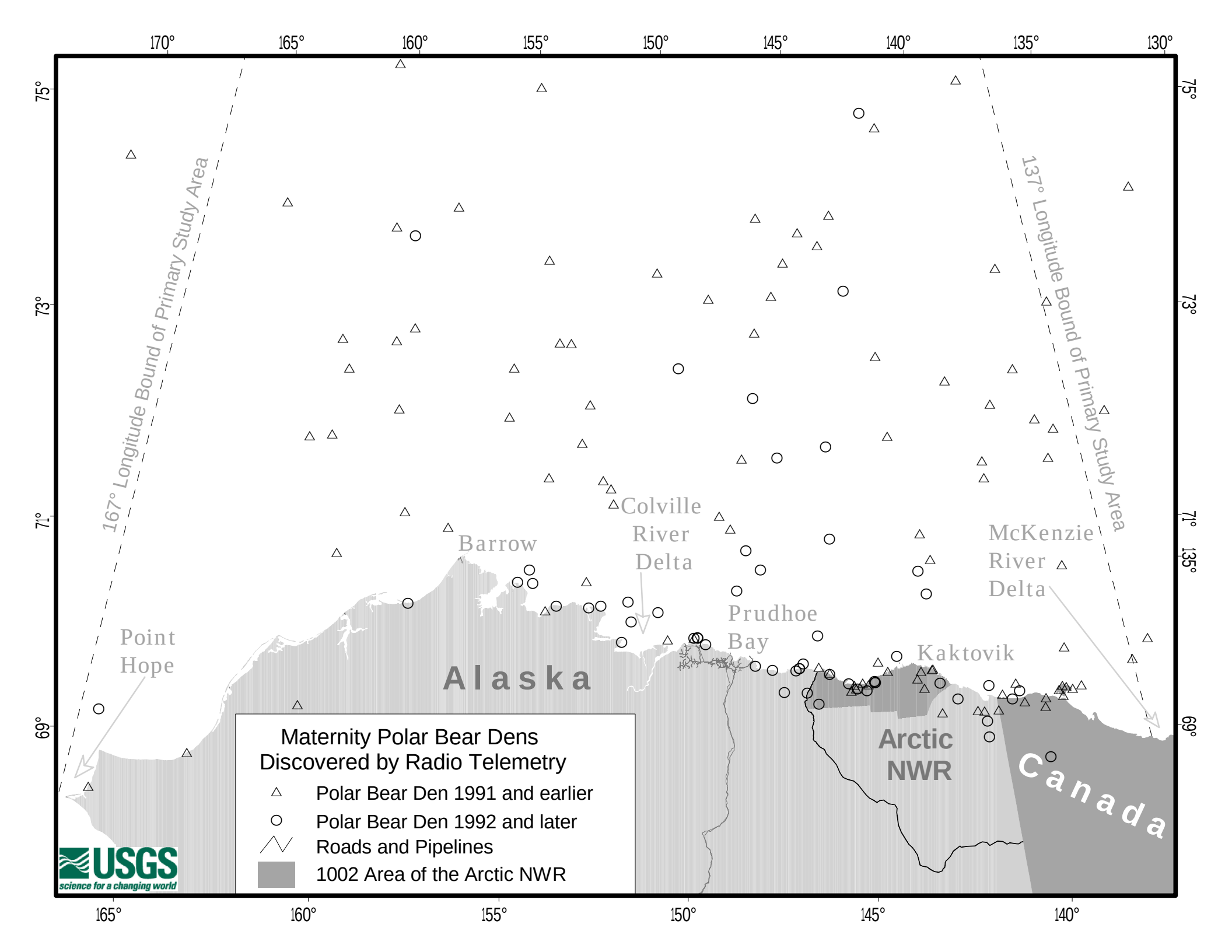
References:

Amstrup, S.C. and C. Gardner. 1994. Polar bear maternity denning in the Beaufort Sea. J. Wildl. manage. 58: 1-10.

Table 1: Distribution of polar bear maternity dens along the mainland coast of Alaska and adjacent Canada between 167° W and 137° W that were discovered by radio telemetry during the period from the spring of 1982 through the spring of 2001.

		Arctic National Wildlife Refuge			1002 Area of the Arctic NWR (Dens in 1002 area are included in the totals for the Arctic NWR)			Other Coastal Areas			
Period	Pack Ice	Fast Ice	Land	Percent of All Land & Fast Ice	Fast Ice	Land	Percent of All Land & Fast Ice	Fast Ice	Land	Percent of All Land & Fast Ice	Total
1982-91	58	1	16	47%	1	12	36%	5	14	53%	94
1992 +	19	2	13	41%	1	10	30%	4	18	59%	56
Total	77	3	29	44%	2	22	33%	9	32	56%	150


170°
165°
160°
155°
150°
145°
140°
135°
130°
75°
73°
71°
69°
167° Longitude Bound of Primary Study Area
137° Longitude Bound of Primary Study Area
Barrow
Colville River Delta
Prudhoe Bay
McKenzie River Delta
Point Hope
Kaktovik
Alaska
Arctic NWR
Canada
Maternity Polar Bear Dens Discovered by Radio Telemetry
Polar Bear Den 1991 and earlier
Polar Bear Den 1992 and later
Roads and Pipelines
1002 Area of the Arctic NWR
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